

## Item #59: Insect and Disease

**Evaluation Question:** What is current insect and disease occurrence and what are trends in comparison to Forest plan Projections?

**Resources to be measured:**

- Acres of MPB mortality by year
- Acres of other bark beetle mortality by year

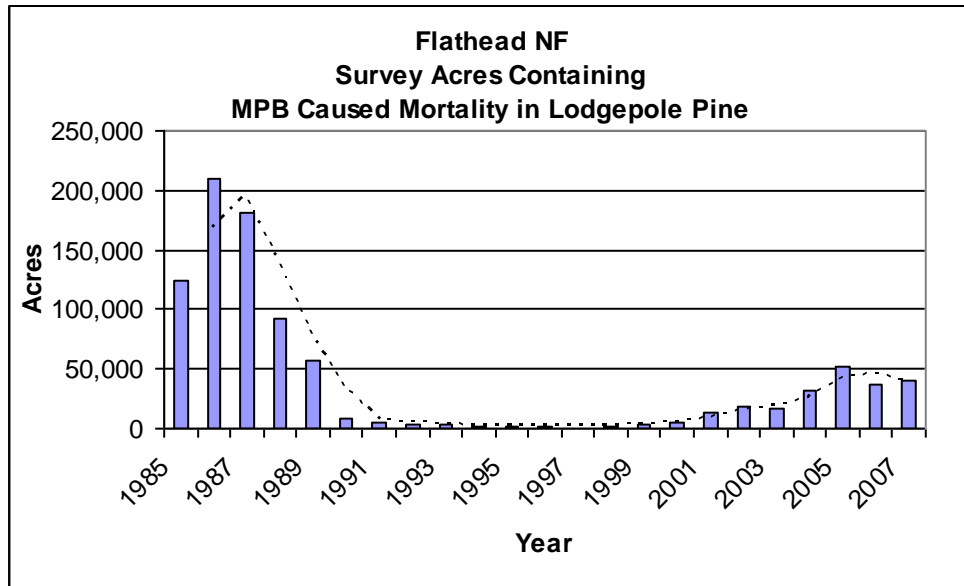
**Data Sources:**

- R1 aerial detection survey and reports
- Maps of insect and disease activity [http://www.fs.fed.us/r1-r4/spf/fhp/aerial/maps/flathead\\_map\\_07.html](http://www.fs.fed.us/r1-r4/spf/fhp/aerial/maps/flathead_map_07.html)

Annual Regional monitoring of insect and disease activity (<http://www.fs.fed.us/r1-r4/spf/fhp/conditions/entry1.html>) occurs primarily as aerial detection surveys. These surveys are flown each summer with a fixed wing aircraft, with surveyors mapping infestations by pest, host tree species, and the number of current year fading trees. In some years, smoke or other factors will prevent a full survey of the forest. Further on-the-ground investigation may be conducted by forest or regional personnel to validate the more general aerial survey data.

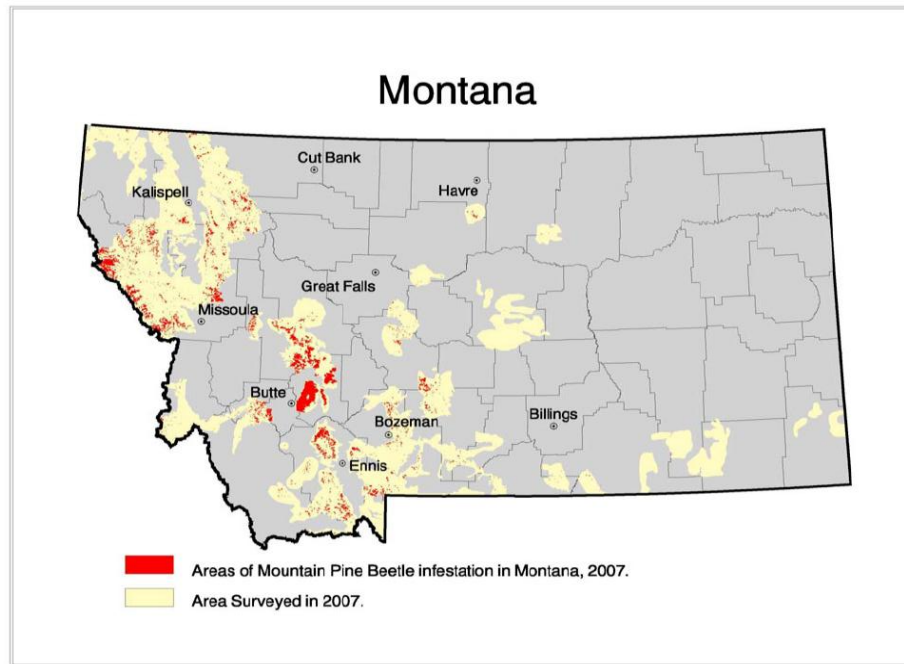
Over time, the largest impact to the Flathead Forest has been from bark beetles, primarily mountain pine beetle. The ecological role of mountain pine beetle (MPB) has been to cause widespread mortality in lodgepole pine stands, setting the stage for stand-replacing fire, and establishment of a new lodgepole pine forest. At the time of development of the Forest Plan in 1986, epidemic levels of MPB mortality were a primary driver of timber management goals and activities.

Summary data from the regional surveys shows that mountain pine beetle activity was at a peak on the Flathead forest in 1981, when 217,000 acres (more than 10% of the forest) were affected. Much of the lodgepole pine dominated forest experienced mortality, and salvage harvest was accelerated in that timeframe. Mountain pine beetle populations dropped in the early 1990s, estimated at a total of 1200 acres of new mortality on the forest in 1990. However, in the last five years, populations are on the upswing again. The combination of prolonged drought, milder winters (leading to greater beetle survival from year to year) and increasing acreage of mature lodgepole pine susceptible to mountain pine beetle attack, have set the stage for these increases. While much smaller in scale than mortality in the 1980s, MPB populations are building in Western Montana, and seem likely to continue to build over the next few years. Flathead National Forest 2007 survey estimated 40,000 acres with recent MPB caused mortality.



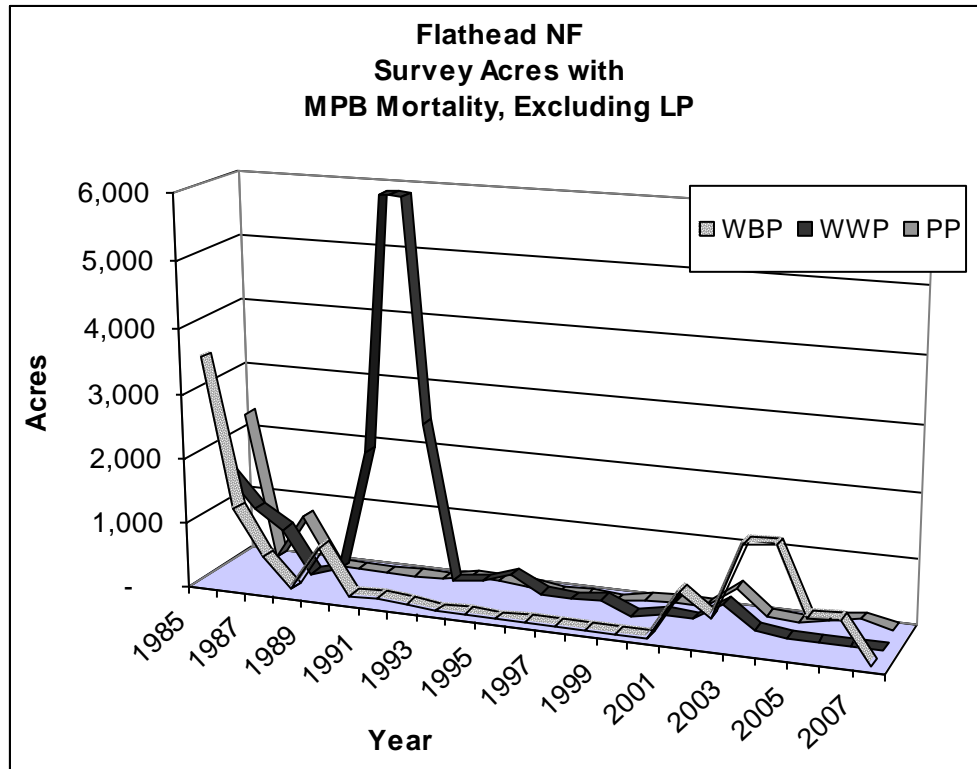
**Figure 1: Acres Containing Mountain Pine Beetle Caused Mortality in Lodgepole Pine**

Current mapping shows that much of the mortality is scattered across the forest. A few concentrations of mortality have been identified at the southern end of the Swan Valley, and near Spotted Bear.



**Figure 2: Map of Mountain Pine Beetle Infestation in Montana, 2007**

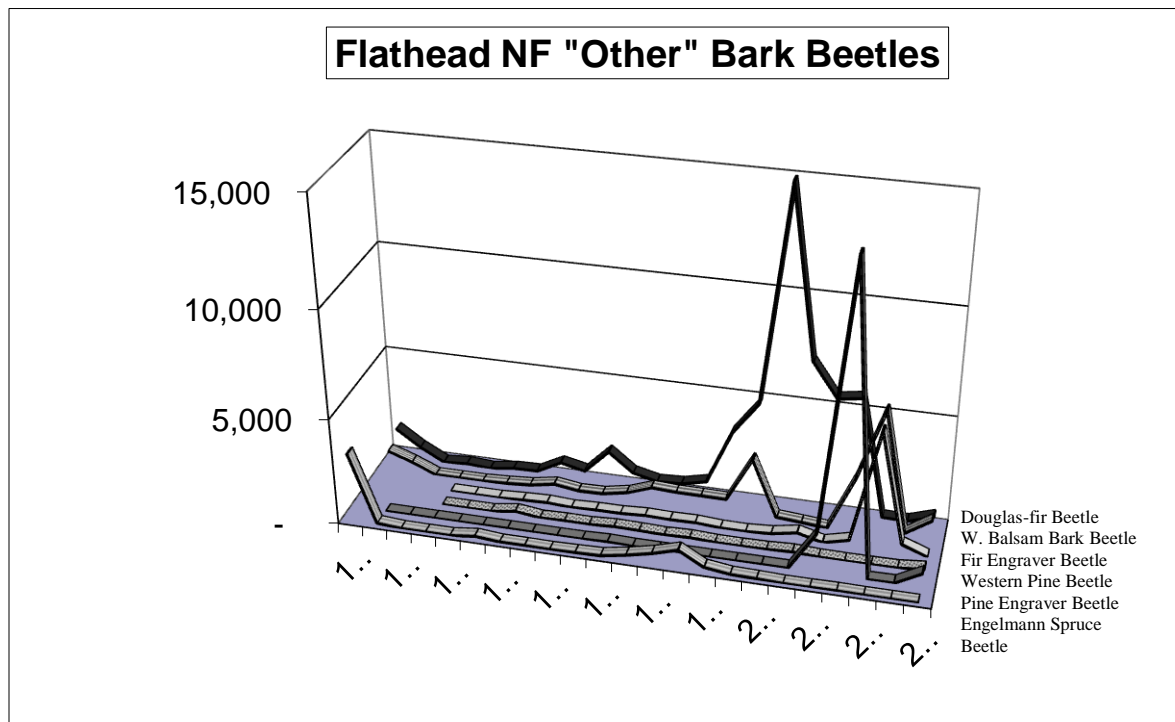
Ponderosa pine, western white pine and white bark pine are all susceptible to mountain pine beetle as well, but the scale of impacts on the forest is quite small. Aerial detection of this mortality, scattered within other timber species, is more difficult, and actual mortality may be underestimated.



**Figure 3: Mountain Pine Beetle Mortality, Excluding Lodgepole Pine**

Continuing bark beetle mortality in white bark pine, in combination with white pine blister rust impacts, and fire suppression have altered the normal cycles of white bark pine forests. Long-term sustainability of these white bark pine (WBP) ecosystems appears to be at risk on the Flathead National Forest and across the region. Whitebark pine is a relatively rare species on the landscape, and plays an important ecological role in high elevation forests. White bark pine is a regional species of concern, and research and restoration projects, on a small scale, are on-going.

Mortality from other bark beetles common to western Montana is displayed below. Total for all of these species was a maximum of 22,800 acres in 2004, and was down to total of 2360 acres in 2007. Douglas-fir beetle (DFB) populations are finally declining, and at the state level DFB mortality is the lowest it has been in a decade.



**Figure 4: Acres of Other Bark Beetles on the Flathead NF, from 1985 to 2007**

Other insects common to Western Montana include defoliators such as Douglas-fir tussock moth, larch casebear, western spruce budworm. None of these have caused significant mortality on the Flathead Forest in the last decade. Additional pathogens impacting the forest include dwarf mistletoe, white pine blister rust, and root diseases. These agents are all present on the forest. They generally affect tree growth, but can result in tree mortality.

The forest will continue to be susceptible to future insect and disease activity. Most of these occurrences are cyclic with weather and vegetation conditions. These agents of change are integral parts of forest ecosystems, often setting the stage for fire and establishment of new forests. However, high levels of insect and disease mortality may not be compatible with other forest plan objectives for wildlife cover, fuel loadings, and sustained levels of forest products.

**Recommended Actions:** Continue to monitor. Consider redesign of this monitoring item during Forest Plan revision. Data from FIA and Forest Health Monitoring are becoming integrated, and should provide a more statistically accurate and repeatable picture of forest health conditions over time. Continue to emphasize and support white bark pine restoration efforts on the forest.